COMM+2.LPCIe User Manual

Item Numbers

7205e & 7205eS

SEALEVEL SYSTEMS INCORPORATED

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Introduction

The Sealevel COMM+2.LPCIe (Item# 7205e) provides a PCI Express 1.0a compliant interface adapter with two asynchronous serial ports for industrial automation and control applications. The serial ports are field selectable for RS-232, RS-422, or RS-485 and support data rates to 921.6K bps.

Configure both ports as RS-232 for standard serial COM: port requirements. Choose the RS-422 mode for long distance device connections up to 4000ft. where noise immunity and high data integrity are essential. Select RS-485 and capture data from multiple peripherals in an RS-485 multi-drop network. Up to 31 RS-485 devices can be connected to each port to automate your data collection. You can even mix the ports in any of the interface combinations to provide maximum flexibility to your application.

In RS-485 mode, the transmitter is automatically enabled in hardware, eliminating the need for application software control. This allows the 7205e to be used with standard serial communications applications and removes the risk of bus contention and data corruption. In RS-232 mode, all modem control signals are implemented for maximum compatibility with a wide range of serial peripherals. The Sealevel SeaCOM software driver and utilities make installation and operation easy using Windows 98, ME, 2000, NT, XP, Vista and Linux operating systems.

The 7205e ships with a low profile PC bracket for use in systems with a low profile PCI Express slot. If you need a standard size PC bracket, order the 7205eS.

Features

- PCI Express two-port serial interface adapter
- Each port configurable for RS-232, RS-422, or RS-485
- High performance 16C950 UART with 128-byte FIFOs
- Each port supports data rates to 921.6K bps
- Oscillator and clock prescaler support wide range of baud rates
- Supports 9-bit protocol framing
- PCI Express 1.0a compliant via X1 connector
- Compatible with all low profile and standard size PCI Express slots
- All modem control signals implemented in RS-232 mode
- Includes 36” cable that terminates to two DB9M connectors

Before You Get Started

What's Included

Depending on the PC bracket ordered, the 7205e is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel for replacement.

- **COMM+2.LPCIe** – Two-Port RS-232/422/485 Serial Interface
  - **7205e** – PCI Express Board with Low Profile PC Bracket
  - **7205eS** – PCI Express Board with Standard Height PC Bracket
- **CA203** – DB25F to (2) DB9M Cable, 36" in Length
- **Sealevel Software CD** – SeaCOM software and user manual

Optional Items

Depending upon your application, you are likely to find one or more of the following items useful with the 2105. All items can be purchased from our website (www.sealevel.com) by calling our sales team at (864) 843-4343.

Cables

DB9F to DB25M (RS-232) Extension Cable (Item# CA177)

The CA177 is a standard AT-style RS-232 modem cable with a DB9F connector on one end and a DB25M connector on the other. This cable is 72 inches in length.

DB9F to DB9M Extension Cable (Item# CA127)

The CA127 allows users to extend a DB9 cable up to six feet. The connectors are pinned one-to-one so the cable is compatible with any device or cable that has DB9 connectors.

Adapters and Converters

DB9F to RJ45 Modular Adapter (Item# RJ9S8)

The RJ9S8 is a DB9 female to RJ45 adapter. It can be configured without tools and is an excellent choice for using available infrastructure wiring.

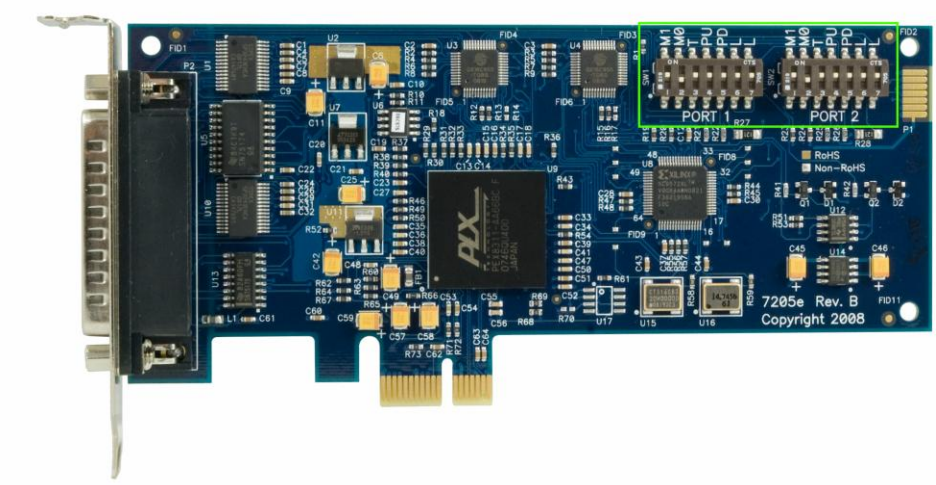
Hardware Configuration

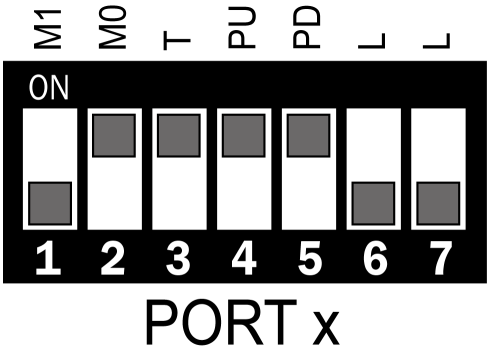
There are two sets of 7-position dipswitches on the board that are used to set the electrical interface, termination and biasing. The dipswitch located at 'SW1' is labeled 'PORT 1' and configures the first serial port. The dipswitch located at 'SW2' is labeled 'PORT 2' and configures the second serial port. The labels and description of the function for each switch are detailed in the following table.

Dipswitch Settings

Switch	Description
M1	Sets the electrical interface mode (with M0)
M0	Sets the electrical interface mode (with M1)
T	Adds or removes 120 termination
PU	Adds or removes 1K pull-up resistor in RS-422/485 mode
PD	Adds or removes 1K pull-down resistor in RS-422/485 mode
L	Connects TX– to RX– for RS-485 two-wire operation
L	Connects TX+ to RX+ for RS-485 two-wire operation

The location of the dipswitches is outlined in green in the image below. The default configuration settings are shown in drawing.




M1
M0
T
PU
PD
L
L
ON
1 2 3 4 5 6 7
PORT x

Electrical Interface Modes

Each port on the 7205e can be individually configured for RS-232, RS-422, or RS-485 mode. The first two switches labeled ‘M1’ and ‘M0’ are used to select the electrical interface. To simplify installation and testing the board is shipped in RS-422 mode. Use the settings in the table below to assist you in configuring the electrical interface.

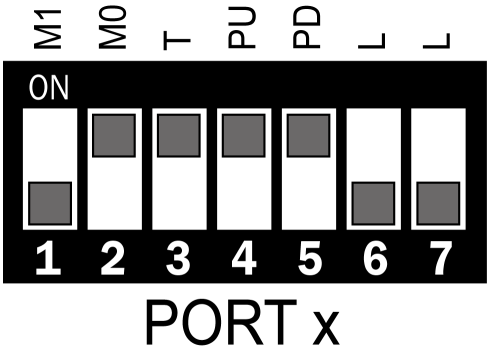
M1	M0	Interface
OFF	OFF	RS-232
OFF	ON	RS-422 **[Default]**
ON	OFF	RS-485 ECHO Enabled
ON	ON	RS-485 No ECHO

Termination & Biasing Resistors

Typically, each end of the RS-485 bus must have line terminating resistors enabled (RS-422 should terminate the receive end only). A 120 ohm resistor is across each RS-422/485 input in addition to a 1K ohm pull-up and pull-down combination that biases the receiver inputs. Use the switches detailed in the table below to customize the interface to your specific requirements.

If using the board in an RS-485 two-wire network, enable the two switches labeled ‘L’, which tie the positive/negative transmit/receive pairs together.

Switch	Default	Description
T	ON	Adds 120Ω termination, OFF to remove
PU	ON	Adds 1K Ω pull-up resistor in RS-422/485 Off to remove
PD	ON	Adds 1K Ω pull-down resistor in RS-422/485 OFF to remove
L	OFF	ON to connect TX– to RX– for RS-485 two-wire
L	OFF	ON to connect TX+ to RX+ for RS-485 two-wire


M1
M0
T
PU
PD
L
L
ON
1 2 3 4 5 6 7
PORT x

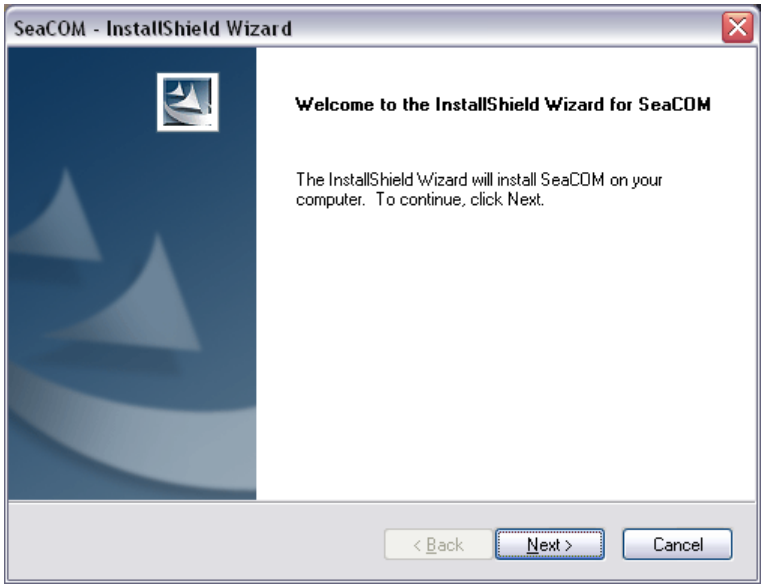
Installation & Configuration

Software Installation

Windows 98/ME/2000/XP/Vista™ Operating Systems

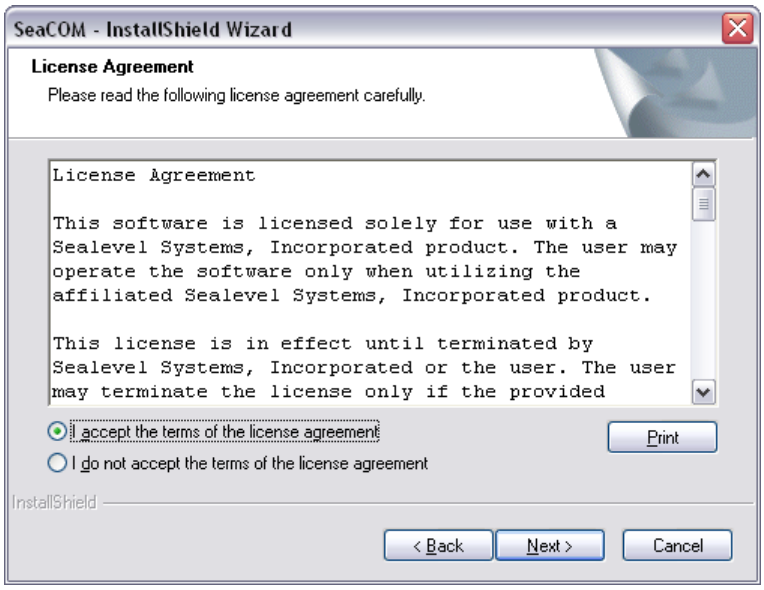
> Do not install the PCI Express board until the software has been successfully installed.

1. Start Windows.
2. Insert the Sealevel Software CD in to your CD drive.
3. If 'Auto-Start' is enabled, the installation window will automatically appear. Otherwise, navigate to the root directory of your CD drive and double-click the 'autorun.exe' application to launch the installation window.
4. Select 'Install' to locate the software and manual for your device.
5. Type in the part number for your device (Item# 7205e) or select it from the list in the drop box.
6. Click the 'Install Drivers' button to launch the Installation Wizard.
7. When the 'SeaCOM - InstallShield Wizard' window appears, click the 'Next' button to initiate the software installation.

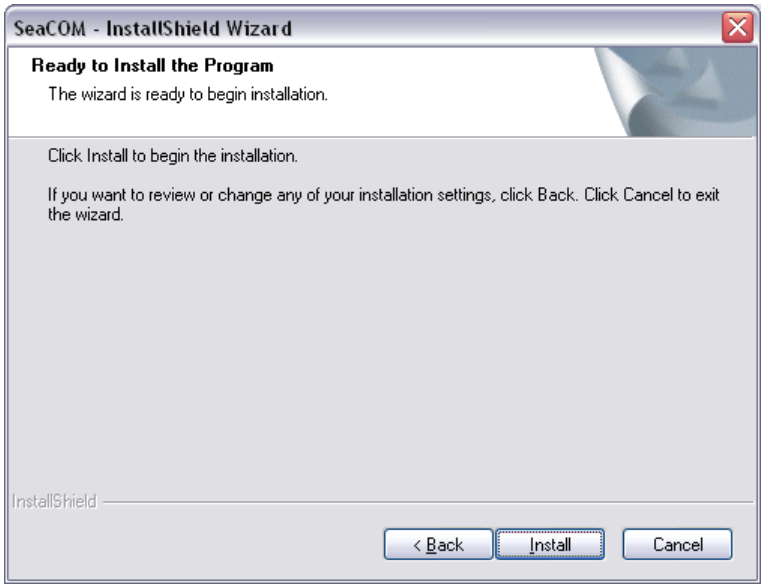

SeaCOM - InstallShield Wizard
Welcome to the InstallShield Wizard for SeaCOM
The InstallShield Wizard will install SeaCOM on your computer. To continue, click Next.
< Back
Next >
Cancel

Software Installation, continued

8. When the 'License Agreement' window appears, accept the terms and click 'Next' to continue. You can click the 'Print' button to print out a copy of the agreement for your records. If you do not accept the terms of the agreement, the installation will stop.


SeaCOM - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
License Agreement
This software is licensed solely for use with a Sealevel Systems, Incorporated product. The user may operate the software only when utilizing the affiliated Sealevel Systems, Incorporated product.
This license is in effect until terminated by Sealevel Systems, Incorporated or the user. The user may terminate the license only if the provided
I accept the terms of the license agreement
I do not accept the terms of the license agreement
Print
InstallShield
< Back
Next >
Cancel

9. When the 'Ready to Install the Program' window appears, click the 'Install' button to install the software onto the hard drive of your computer. The files will be automatically installed into the 'C:\Program Files' folder on your computer.


SeaCOM - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Software Installation, continued

10. A dialog box will appear, as shown, with important information. Click the 'OK' button to continue.

SeaCOM - InstallShield Wizard
During installation, you may receive a warning indicating drivers being installed may not be certified by Microsoft's certification labs. If you receive this message you should click 'yes' to allow installation. All applications and drivers have been fully tested to maintain the integrity of your operating system.
OK

11. During installation, you may receive a warning dialog stating, "The publisher cannot be determined due to the problems below: Authenticode signature not found." Click the 'Yes' button to proceed with the installation. This declaration means that SeaCOM has not been certified by Microsoft's testing labs.

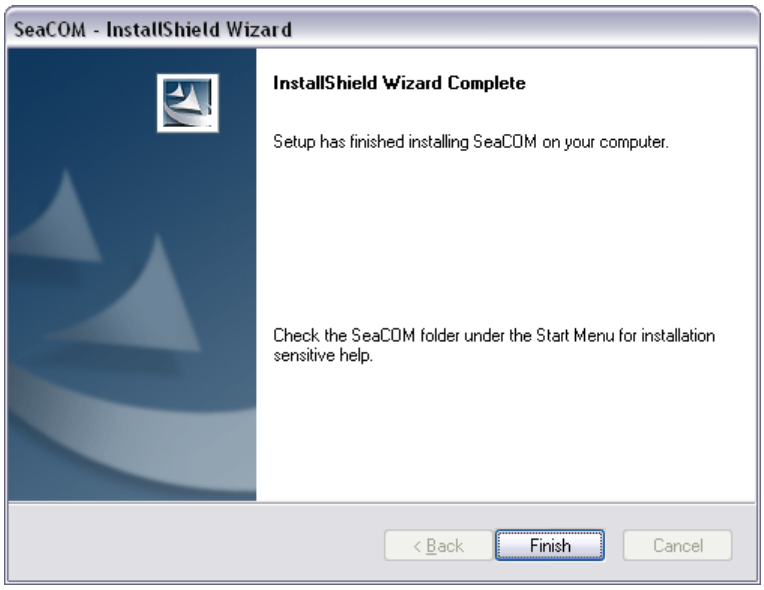
    Note: All SeaCOM software and drivers have been fully tested by Sealevel. Clicking 'Yes' will not harm your system.

12. If SeaCOM has been previously installed on your computer, you do not need to install it again. If you are upgrading SeaCOM, you should remove the previous version before installing the latest version. Refer to the 'Uninstall & Upgrade Instructions' section of this manual; otherwise, click 'OK' to continue.

SeaCOM - InstallShield Wizard
If SeaCOM has previously been installed on this computer, you should go to the Device Manager and uninstall any SeaCOM cards. You should also reboot your computer before installing any card(s).
OK

Software Installation, continued

13. The setup file will automatically detect the operating environment and install the proper components. When the 'InstallShield Wizard Complete' window appears, click 'Finish' to close the window and complete the software installation.


SeaCOM - InstallShield Wizard
InstallShield Wizard Complete
Setup has finished installing SeaCOM on your computer.
Check the SeaCOM folder under the Start Menu for installation sensitive help.
< Back
Finish
Cancel

14. Click the 'X' in the top-right corner of the 'Product Finder' screen to close the CD installation window.
15. Proceed with the hardware installation of your PCI Express serial interface adapter.

Linux Installation

Refer to the subdirectory D:\Software\SeaCOM\Other\Linux\ (replace "D:" with your actual CD drive letter) found on the Sealevel Software CD. This folder contains valuable information on installing your serial adapter in the various Linux releases. Also included is a series of files explaining proper Linux syntax and typical Linux serial implementations.

3rd Party Software Support

Third party software support for many HMI/MMI and other process control software is included on the product installation CD. For the most up to date

information on third party software support, please visit www.sealevel.com/thirdpartysoftware.asp.

Hardware Installation

> Do not install the PCI Express board until the software has been successfully installed.

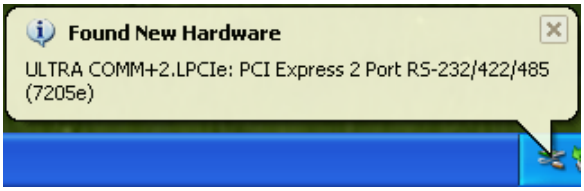
The 7205e is shipped configured for RS-422 mode. If you intend to use RS-232 or RS-485 modes, configure the adapter before installation.

Once you have installed the software, install the 7205e into an available PCI Express slot and boot the computer. The drivers that were installed during the software installation process will automatically be used to configure the adapter.

NOTE: Once the hardware installation begins, the Found New Hardware wizard will appear **three times** – first for the parent multi-interface, and then two more times for each serial port.

The following instructions are applicable to the Windows XP operating system and may vary depending on your version of Windows.

1. After the software installation is complete, install the 7205e into an available PCI Express slot and boot the computer.
2. A 'Found New Hardware' alert will appear above the system tray.

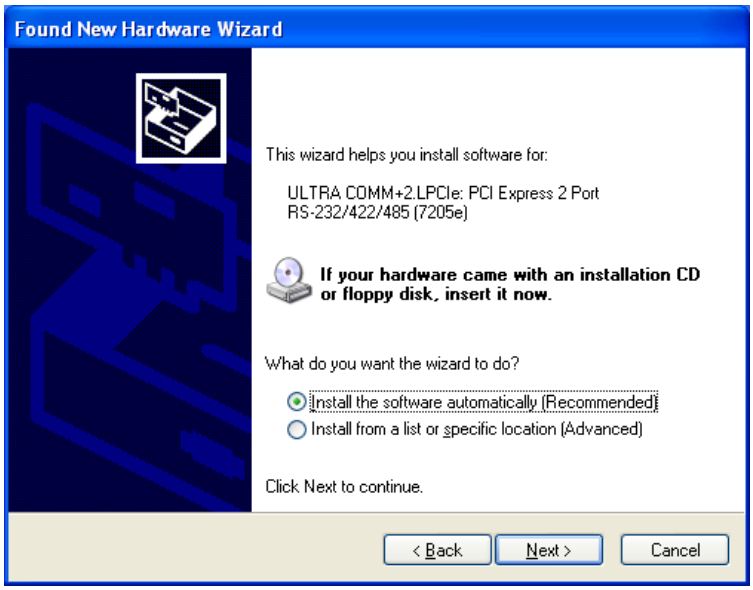


3. The 'Found New Hardware Wizard' will appear.
4. Choose 'No, not this time' and click 'Next' to proceed.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

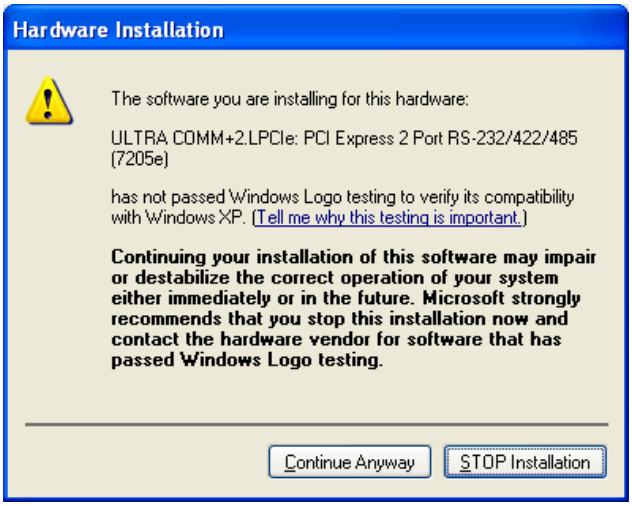
Hardware Installation, continued

5. Choose 'Install the software automatically' and click 'Next'.

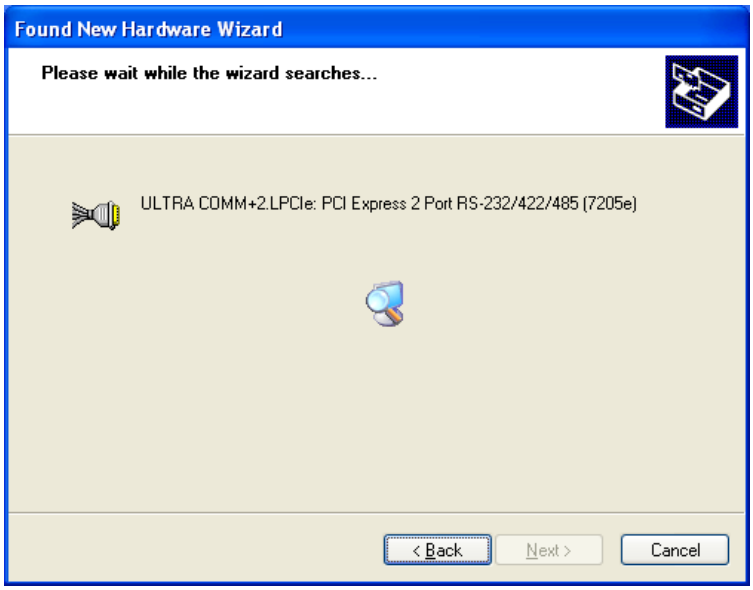

Found New Hardware Wizard
This wizard helps you install software for:
ULTRA COMM+2.LPCIe: PCI Express 2 Port RS-232/422/485 (7205e)
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

6. The 'Hardware Wizard' will search for the proper drivers; however, it may be interrupted by a message stating that the hardware has not passed Windows certification. Click on 'Continue Anyway'.

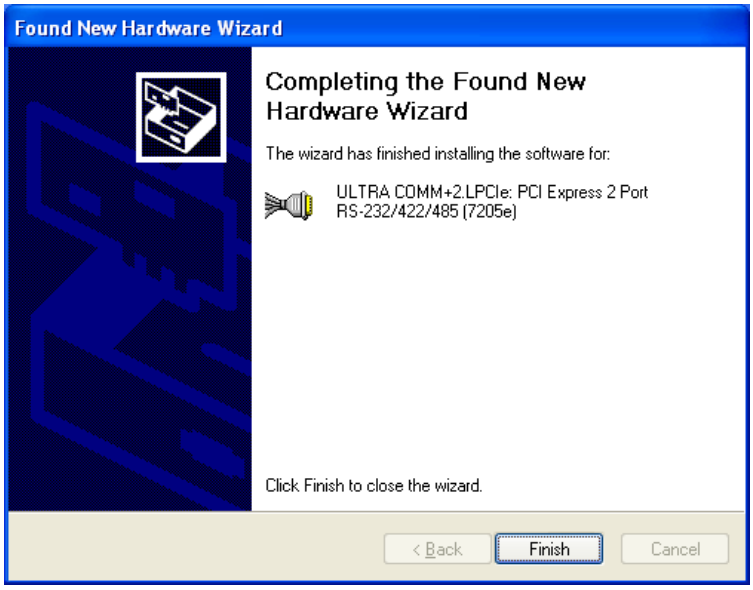
Note: All SeaCOM software and drivers have been fully tested by Sealevel. Clicking 'Continue anyway' will not harm your system.


Hardware Installation
The software you are installing for this hardware:
ULTRA COMM+2.LPCIe: PCI Express 2 Port RS-232/422/485 (7205e)
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

7. The appropriate drivers for your SeaLINK device and version of Windows will be installed as shown.

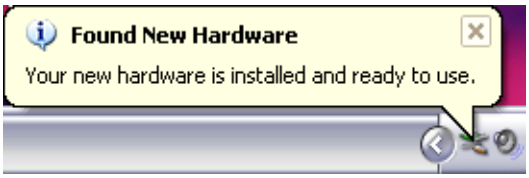

Found New Hardware Wizard
Please wait while the wizard searches...
ULTRA COMM+2.LPCIe: PCI Express 2 Port RS-232/422/485 (7205e)
< Back
Next >
Cancel

8. Click 'Finish' to complete the installation of your hardware.


Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
ULTRA COMM+2.LPCIe: PCI Express 2 Port RS-232/422/485 (7205e)
Click Finish to close the wizard.
< Back
Finish
Cancel

9. The 'Found New Hardware Wizard' appears **two more times** - once for each serial port; repeat steps 4-8.

10. When the ‘Found New Hardware’ alert informs you that your hardware is installed and ready to use, you can proceed with verifying the installation to check functionality and/or locate the COM port assignments, if necessary.



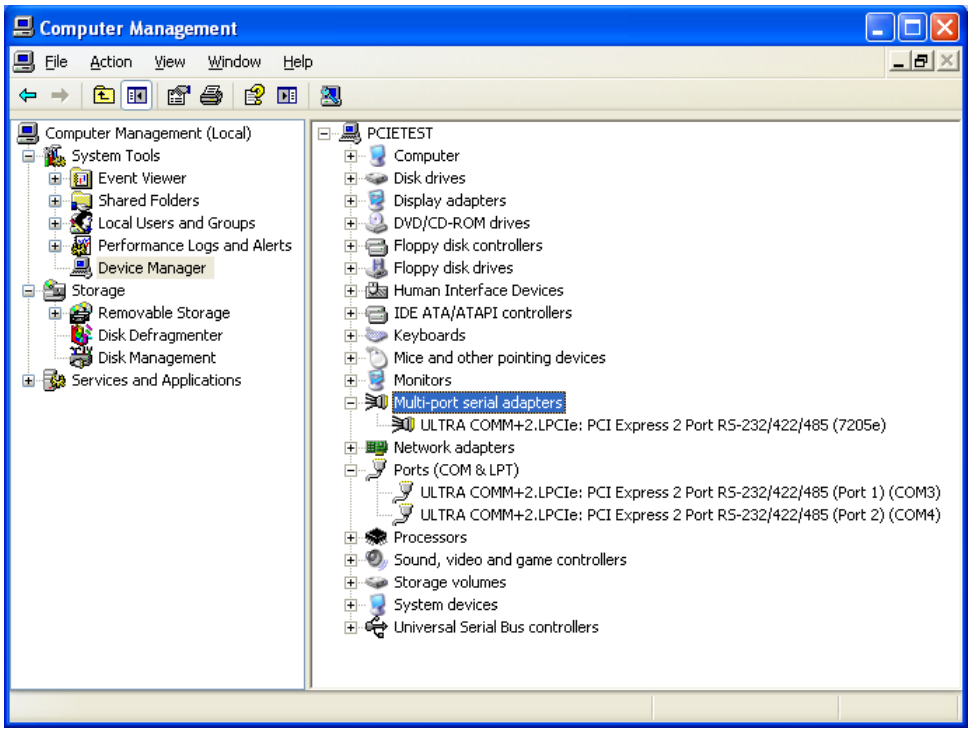
Verifying Installation

To confirm that the serial port has been successfully installed, look in Device Manager under 'Ports (COM &LPT)' and the COM assignment will be included with the associated COM number in parentheses.

To access Device Manager, follow the steps below:

1. Right click on 'My Computer' icon on your desktop or in the Start menu.
2. Click 'Manage' in the fly out menu to launch the 'Computer Management' console window.
3. In the left pane under 'System Tools', click 'Device Manager'.
4. In right pane near the bottom, expand the 'Multi-port serial adapters' section by clicking the '+' symbol. This shows the parent device is installed correctly.
5. Below that section, expand the 'Ports (COM & LPT)' section.
6. You should now see the COM assignment with the associated COM number in parentheses.

   Note: Your system will assign the next available COM numbers, which will vary by computer (COM3 and COM4 as shown in this example).



Uninstall & Upgrade Instructions

The SeaCOM software program adds entries to the system registry that are necessary for specifying the operating parameters for your device. To completely remove the hardware and associated software, follow the steps in the order they appear.

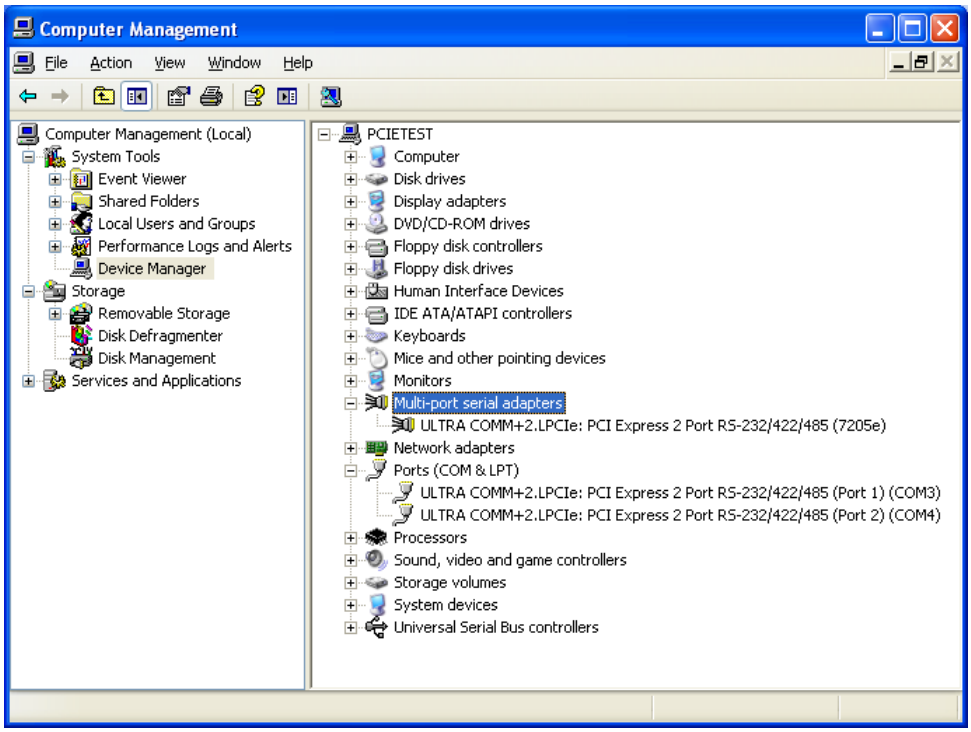
To upgrade to the latest version of SeaCOM, follow the instructions to uninstall the hardware and software, followed by the upgrade instructions.

> **Important!**
> Start with the hardware installed in a PCI Express slot.
> Do not remove until instructed to do so.

Remove Hardware Using Device Manager

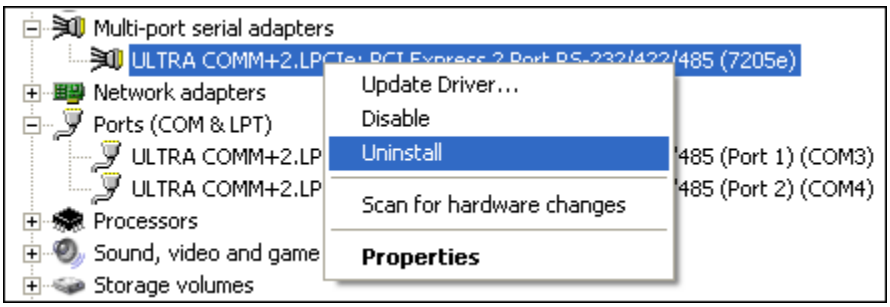
To access Device Manager, follow the steps below:

1. Right click on 'My Computer' icon on your desktop or in the Start menu.
2. Click 'Manage' in the fly out menu to launch the 'Computer Management' console window.
3. In the left pane under 'System Tools', click 'Device Manager'.
4. In right pane near the bottom, expand the 'Multi-port serial adapters' section by clicking the '+' symbol.
5. Locate the ULTRA COMM+2.LPCIe device in the listing.

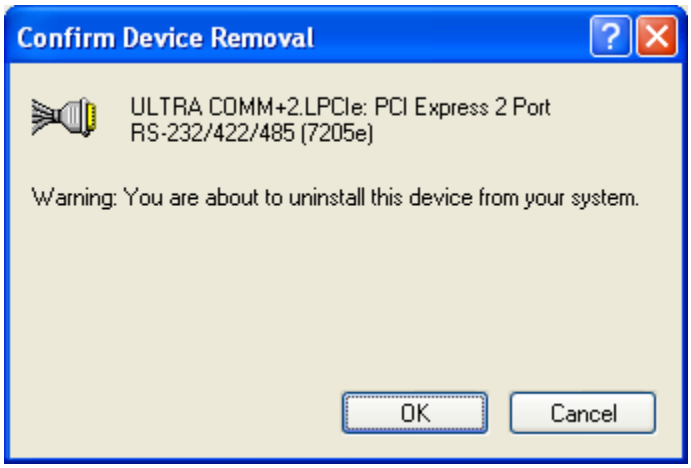


Remove Hardware, continued

6. Right click on the entry for the 'ULTRA COMM+2.LPCIe' device and click 'Uninstall' in the fly out menu.



7. Confirm that you want to uninstall the device by clicking the 'OK' button. This will remove the hardware, COM ports and all registry entries from your computer. Keep the device installed.

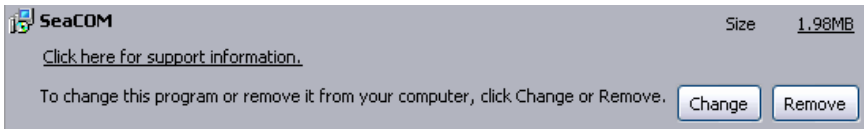

Confirm Device Removal
ULTRA COMM+2.LPCIe: PCI Express 2 Port RS-232/422/485 (7205e)
Warning: You are about to uninstall this device from your system.
OK
Cancel

8. The window will refresh and the entry for the device will no longer appear. Proceed with removing the software on the following pages.

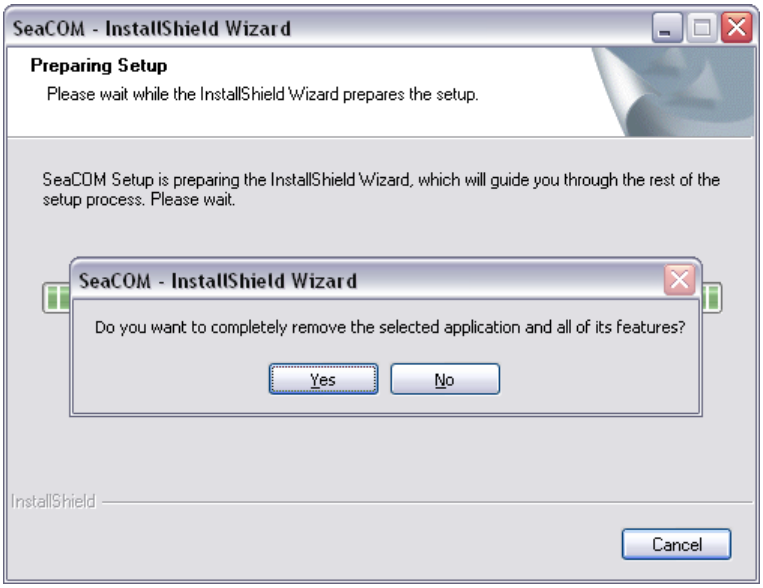
Remove Software Using Control Panel

Make sure you have first removed the hardware using the instructions on the previous page before removing the software, otherwise remnants of the configuration settings will be left on your system. Keep the device installed until the software has been completely uninstalled.

1. Access the Control Panel by clicking the 'Start' button, and then 'Control Panel'.
2. In the Control Panel window, double-click the 'Add or Remove Programs' icon (In Windows Vista, double-click on 'Programs and Features').
3. The Add or Remove Programs window will list all currently installed software on your system. It may take awhile to load all of the software installed. Locate the entry for 'SeaCOM' and click to highlight.
4. Click the 'Remove' button.


SeaCOM
Size 1.98MB
Click here for support information.
To change this program or remove it from your computer, click Change or Remove.
Change
Remove

5. The 'SeaCOM – InstallShield Wizard' window will appear along with a dialog box asking you to confirm. Click the 'Yes' button to continue.


SeaCOM - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
SeaCOM Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
SeaCOM - InstallShield Wizard
Do you want to completely remove the selected application and all of its features?
Yes
No
InstallShield
Cancel

6. When the uninstallation completes, click the 'Finish' button to close the window. Click the 'Ok' button on the dialog box.

If you are upgrading, leave the device installed and proceed to the Upgrade Instructions section.

If you want to completely remove the hardware and software from your computer, power down your computer, remove the device from the PCI Express slot, and then reboot your computer to complete the uninstallation.

Upgrade Instructions

With the device still installed in a PCI Express slot, install the latest version of SeaCOM. You can download the latest version of SeaCOM from the product page on the Sealevel website. Follow the software installation steps detailed in the preceding 'Software Installation' section.

1. Once the SeaCOM software has been installed successfully, access Device Manager.
2. At the top of the 'Device Manager' window, click 'Action', and then click 'Scan for Hardware Changes'.
3. The 'Found New Hardware Wizard' window will appear. Select 'No, not this time', and then click the 'Next' button.
4. Refer to the 'Hardware Installation' instructions in the preceding section to complete the upgrade.
5. When the 'Found New Hardware' alert informs you that your hardware is installed and ready to use, you can proceed with verifying the installation to check functionality and/or locate the COM port assignments, if necessary

Hardware Description

PCI Express Board

The 7205e is a low profile PCI Express 1.0a compliant board via single-lane x1 slot. It can be used in any single- or multi-lane PCI Express slot. It is available in standard height PCI Express as item# 7205eS.

DB25M Board Connector

The board integrates a DB25 male connector for interfacing the two serial ports via the included cable.

DB9M Serial Connectors

The 7205e ships with a two-port cable (Item# CA203) that includes a pair of DB9 male serial connectors. The pin out for these connectors is detailed in the following Electrical Specifications section.

Electrical Specifications

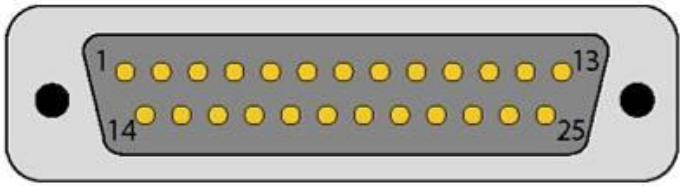
Each serial port utilizes a 16C950 UART featuring programmable baud rates, data format, interrupt control and industry-leading 128-byte transmit and receive FIFOs. This high-performance UART includes 9-bit framing support and is fully software compatible with legacy 16550 applications. In addition, the 14.7456 oscillator and UART's flexible clock prescaler supports the widest range of standard and non-standard baud rates to 921.6K bps. Refer to Appendix C for cable length limitations.

Connector Pin Assignments

Board Connector (DB25 Male)

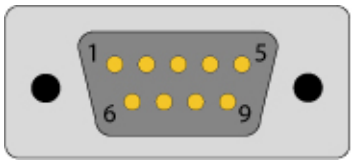
The 7205e board includes a DB25 male connector for attaching the included cable (Item# CA203). The pin out for the DB25M connector is shown in the table below.

Port 1 Pin#	Port 2 Pin#	RS-232	RS-422/485
1	11	RD	RD –
2	12	CTS	CTS –
3	13	DCD	RD +
4	14	TD	TD –
5	15	RTS	RTS –
6	16	DSR	RTS +
7	17	DTR	TD +
8	18	RI	CTS +
9	10	GND	GND



Cable Pin Assignments

The 7205e includes a cable (Item# CA203) with a DB25 female connector terminating to a pair of DB9 male connectors. The DB25F connector on the cable plugs into the DB25M connector on interface board. The DB9M connectors are compatible with a variety of serial peripherals. The pin assignments for the supported electrical interfaces are shown in the tables below.



RS-232 (DB9 Male)

These RS-232 pin assignments meet EIA/TIA/ANSI-574 DTE specifications for DB9 type connectors.

Pin #	Signal	Name	Mode
1	DCD	Data Carrier Detect	Input
2	RD	Receive Data	Input
3	TD	Transmit Data	Output
4	DTR	Data Terminal Ready	Output
5	GND	Ground	
6	DSR	Data Set Ready	Input
7	RTS	Request To Send	Output
8	CTS	Clear To Send	Input
9	RI	Ring Indicator	Input

Note: Please terminate any control signals that are not going to be used. The most common way to do this is connect RTS to CTS and RI. Also, connect DCD to DTR and DSR. Terminating these pins, if not used, will help insure you get the best performance from your adapter.

RS-422 & RS-485 (DB9 Male)

Pin #	Signal	Name	Mode
1	RX +	Receive Data Positive	Input
2	RX –	Receive Data Negative	Input
3	TX –	Transmit Data Negative	Output

4	TX +	Transmit Data Positive	Output
5	GND	Ground	
6	RTS +	Request to Send Positive	Output
7	RTS –	Request to Send Negative	Output
8	CTS –	Clear to Send Negative	Input
9	CTS +	Clear to Send Positive	Input

Baud Rates and Oscillator Value

The 7205e utilizes a 14.7456MHz oscillator, which is automatically entered by the SeaCOM driver under Windows 2000/XP/Vista operating systems. The oscillator value can be found in the COM port properties of Device Manager under the 'Advanced Tab'.

The high-speed oscillator and the UART's flexible clock prescaler support a wide range of standard and non-standard baud rates. You simply need to select the appropriate baud rate in your communications software and the driver will calculate the closest matching baud rate.

When you use the board in other operating systems like Linux, the baud rate you select is multiplied by eight resulting in the actual, faster baud rate. This allows the board to achieve data rates to 921.6K bps.

The following table shows common baud rates and the baud rates you need to select in your application running on operating systems other than Windows.

For this Data Rate	Choose this Data Rate
1200 bps	150 bps
2400 bps	300 bps
4800 bps	600 bps
9600 bps	1200 bps
19.2K bps	2400 bps
38.4K bps	4800 bps
57.6K bps	7200 bps
115.2 K bps	14.4K bps
230.4K bps	28.8K bps
460.8K bps	57.6 K bps
921.6K bps	115.2 K bps

If your communications package allows the use of baud rate divisors, choose the appropriate divisor from the following table:

For this Data Rate	Choose this Divisor
1200 bps	768

2400 bps	384
4800 bps	192
9600 bps	96
19.2K bps	48
38.4K bps	24
57.6K bps	16
115.2K bps	8
230.4K bps	4
460.8K bps	2
921.6K bps	1

Technical Specifications

Dimensions

Length	Width
5.75”	2.54”
14.60 cm	6.45 cm

Environmental Specifications

Specification	Operating	Storage
Temperature Range	0º to 70º C (32º to 158º F)	-50º to 105º C (-58º to 221º F)
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

Power Requirements

Supply Line	Requirements
12VDC	121mA (1.4W)
3.3VDC	218mA (0.7W)

Manufacturing

All Sealevel Systems Printed Circuit boards are built to UL 94V0 rating and are 100% electrically tested. These printed circuit boards are solder mask over bare copper or solder mask over tin nickel.

Appendix A – Troubleshooting

The adapter should provide years of trouble-free service. However, in the event that it appears to be functioning incorrectly, the following tips can eliminate most common problems without the need to call Technical Support.

1. Ensure that the Sealevel Systems SeaCOM software has been installed on the machine, so that the necessary files are in place to complete the installation. To confirm installation, click on the Windows 'Start' button and then select 'All Programs'. You should see the 'SeaCOM' program folder listed.

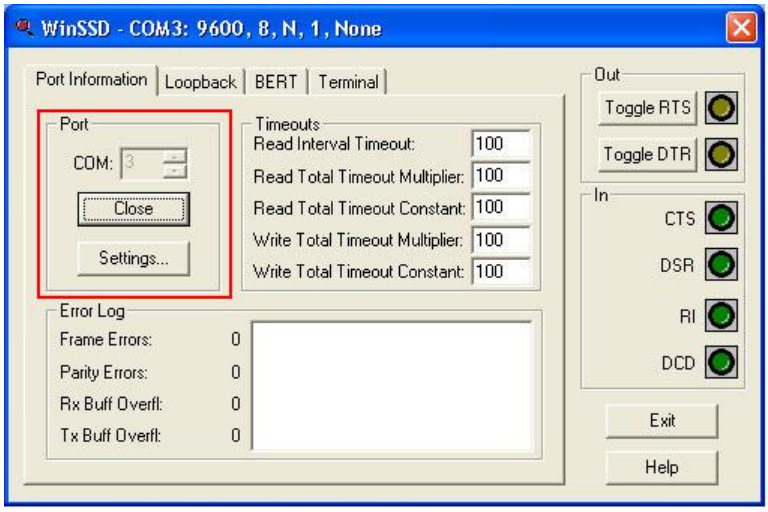
   Note: The SeaCOM driver must be installed before the adapter is connected to your computer.

2. While Device Manager is open, locate the COM ports (described under 'Verifying Installation' in the Installation and Configuration section of this manual).

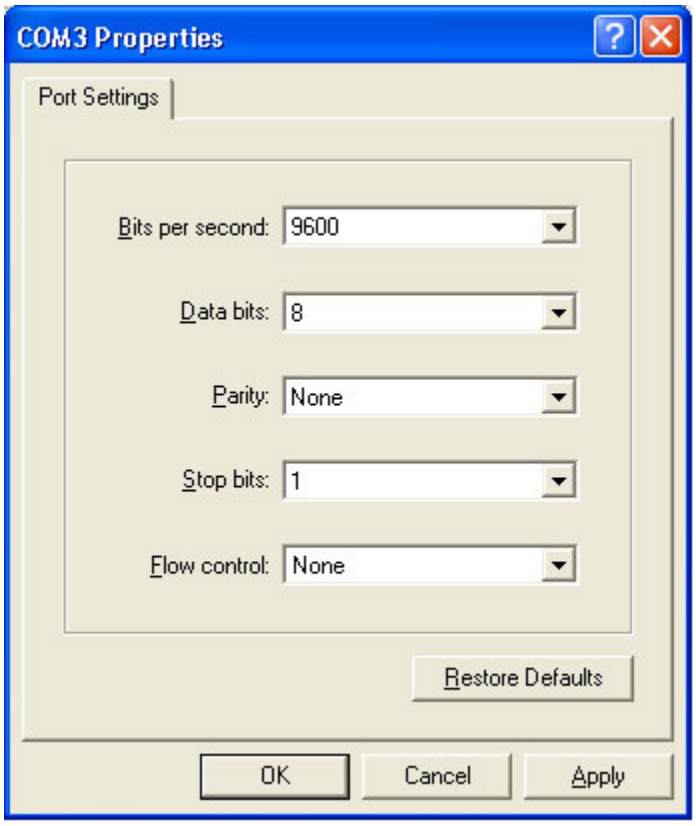
3. Once you have confirmed that the COM ports are listed in Device Manager, you can use the Sealevel WinSSD utility and a loopback plug (Item# LB101 or Item# LB102) to test communications. Detailed help is included in the WinSSD utility.

   - If you have a loopback plug, put it on the serial connector that you want to test. If you don't have a loopback plug, contact Technical Support for assistance.
   - To test communications, launch the WinSSD utility in the SeaCOM folder under the 'Start' menu.

- On the 'Port Information' tab, select the COM port you want to test and click on the 'Open' button. (*See image below*)

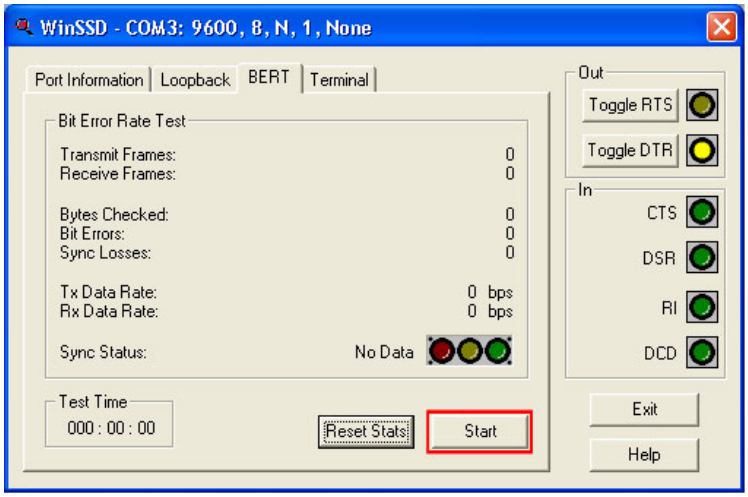


- Click the 'Settings' button to open the COM Properties menu. Change your parameters to 9600 bits per second, 8 data bits, no parity, 1 stop bit, and no flow control, as pictured below.

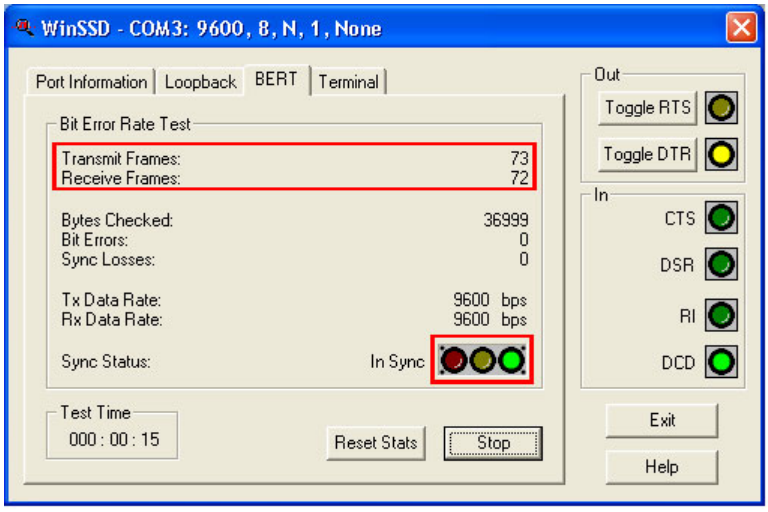


- Click 'Apply' and 'OK'.

- Click on the 'Start' button. If testing RS-485, be sure that ECHO is enabled. (*See image below*)



- If the COM port is working properly, the green light will glow and the Transmit Frames and Receive Frames will increase. The Tx and Rx Data Rates will show the calculated data rate. (*See image below*)



- You can continue testing this port with different configurations or proceed with testing other ports, if necessary.

Technical Support

If these steps do not solve your problem, please contact Technical Support.

Monday – Friday
8:00 am to 5:00 pm EST

Phone: +1 (864) 843-4343
Email: support@sealevel.com

Appendix B – How To Get Assistance

Begin by reading the Troubleshooting Guide (Appendix A). This will help solve most common problems.

1. When calling for technical assistance, please have the device installed and ready to run diagnostics. If possible, have your user manual and current adapter settings ready.
2. The Sealevel website is an excellent resource located at www.sealevel.com. The most current software updates and user manuals are available via our homepage by clicking on the 'Drivers' or 'Manuals' links located under 'Technical Support.' Manuals and software can also be downloaded from the product page for your device.
3. The FAQ section of our website answers many common questions. Refer to this helpful resource by visiting www.sealevel.com/faq.asp.

Technical Support

Monday – Friday
8:00 am to 5:00 pm EST
Phone: +1 (864) 843-4343
Email: support@sealevel.com

RETURN AUTHORIZATION MUST BE OBTAINED FROM SEALEVEL SYSTEMS BEFORE RETURNED MERCHANDISE WILL BE ACCEPTED. AUTHORIZATION CAN BE OBTAINED BY CALLING SEALEVEL SYSTEMS AND REQUESTING A RETURN MERCHANDISE AUTHORIZATION (RMA) NUMBER.

Appendix C – Electrical Interface

RS-232

Quite possibly the most widely used communication standard is RS-232. This implementation has been defined and revised several times and is often referred to as RS-232 or EIA/TIA-232. The IBM PC computer defined the RS-232 port on a 9-pin D-sub connector, and subsequently, the EIA/TIA approved this implementation as the EIA/TIA-574 standard. This standard is defined as the 9-Position Non-Synchronous Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange. Both implementations are in widespread use and will be referred to as RS-232 in this document. RS-232 is capable of operating at data rates up to 20K bps at distances less than 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. RS-232 is a single-ended or unbalanced interface, meaning that a single electrical signal is compared to a common signal (ground) to determine binary logic states. The RS-232 and the EIA/TIA-574 specification define two types of interface circuits: Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE).

RS-422

The RS-422 specification defines the electrical characteristics of balanced voltage digital interface circuits. RS-422 is a differential interface that defines voltage levels and driver/receiver electrical specifications. On a differential interface, logic levels are defined by the difference in voltage between a pair of outputs or inputs. In contrast, a single ended interface, for example RS-232, defines the logic levels as the difference in voltage between a single signal and a common ground connection. Differential interfaces are typically more immune to noise or voltage spikes that may occur on the communication lines. Differential interfaces also have greater drive capabilities that allow for longer cable lengths. RS-422 is rated up to 10 Megabits per second and can have cabling 4000 feet long. RS-422 also defines driver and receiver electrical characteristics that will allow 1 driver and up to 32 receivers on the line at once. RS-422 signal levels range from 0 to +5 volts. RS-422 does not define a physical connector.

RS-485

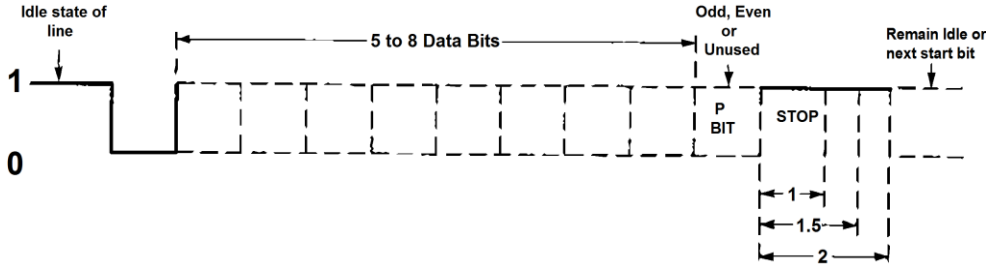
RS-485 is backwardly compatible with RS-422; however, it is optimized for partyline or multi-drop applications. The output of the RS-422/485 driver is capable of being **Active** (enabled) or **Tri-State** (disabled). This capability allows multiple ports to be connected in a multi-drop bus and selectively polled. RS-485 allows cable lengths up to 4000 feet and data rates up to 10 Megabits per second. The signal levels for RS-485 are the same as those defined by RS-422. RS-485 has electrical characteristics that allow for 32 drivers and 32 receivers to be connected to one line. This interface is ideal for multi-drop or network environments. RS-485 tri-state driver (not dual-state) will allow the electrical presence of the driver to be removed from the line. Only one driver may be active at a time and the other driver(s) must be tri-stated. RS-485 can be cabled in two ways, two wire and four wire mode. Two wire mode does not allow for full duplex communication, and requires that data be transferred in only one direction at a time. For half-duplex operation, the two transmit pins should be connected to the two receive pins (Tx+ to Rx+

and Tx- to Rx-). Four wire mode allows full duplex data transfers. RS-485 does not define a connector pin-out or a set of modem control signals. RS-485 does not define a physical connector.

Appendix D – Asynchronous Communications

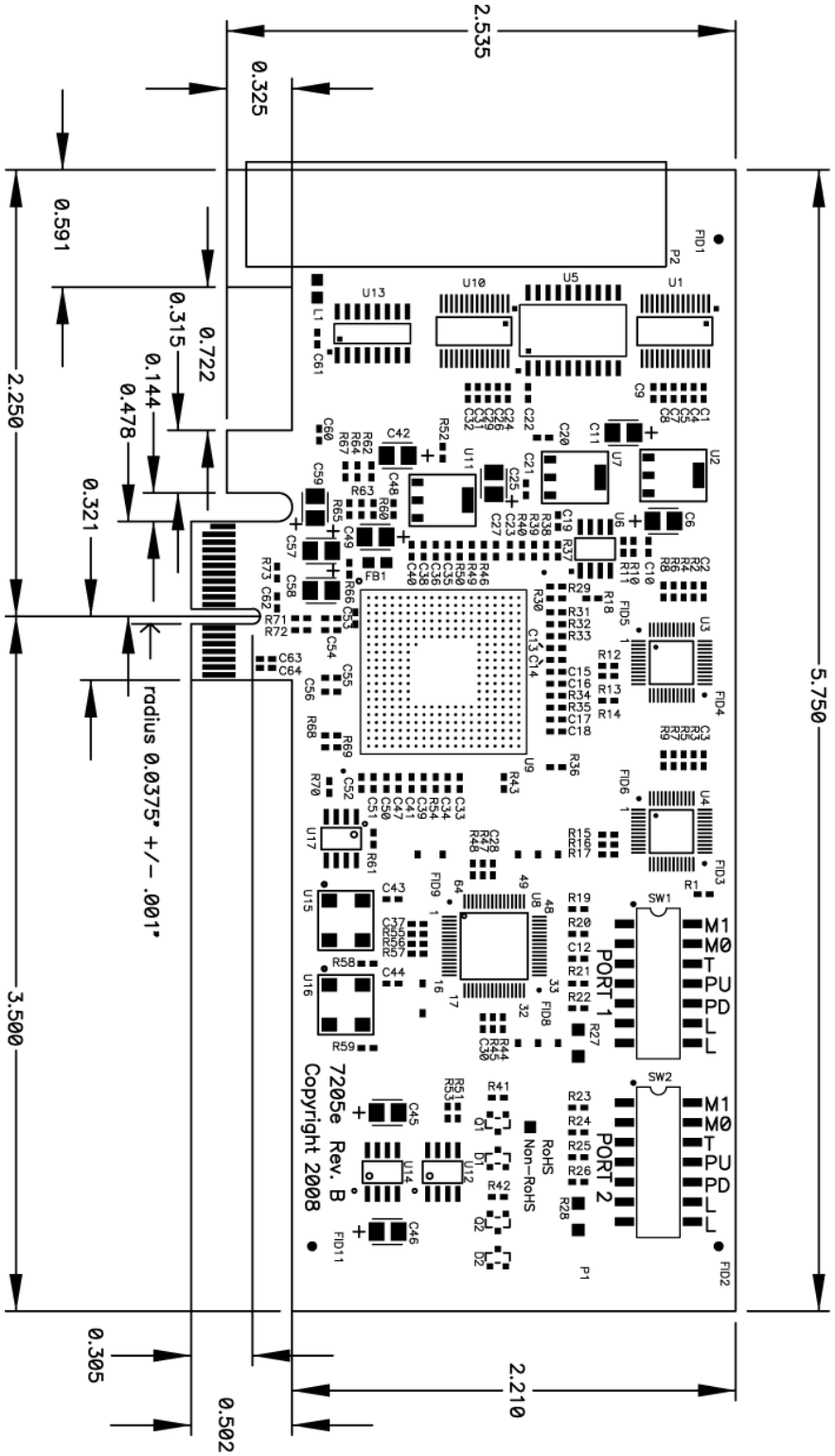
Serial data communications implies that individual bits of a character are transmitted consecutively to a receiver that assembles the bits back into a character. Data rate, error checking, handshaking, and character framing (start/stop bits) are pre-defined and must correspond at both the transmitting and receiving ends.

Asynchronous communications are the standard means of serial data communication for PC compatible and PS/2 computers. The original PC was equipped with a communication or COM port that was designed around an 8250 Universal Asynchronous Receiver Transmitter (UART). This device allows asynchronous serial data to be transferred through a simple and straightforward programming interface. A starting bit followed by a pre-defined number of data bits (5, 6, 7, or 8) defines character boundaries for asynchronous communications. The end of the character is defined by the transmission of a pre-defined number of stop bits (usually 1, 1.5 or 2). An extra bit used for error detection is often appended before the stop bits. The diagram below demonstrates asynchronous communication bits.



This special bit is called the parity bit. Parity is a simple method of determining if a data bit has been lost or corrupted during transmission. There are several methods for implementing a parity check to guard against data corruption. Common methods are called (E)ven Parity or (O)dd Parity. Sometimes parity is not used to detect errors on the data stream. This is refereed to as (N)o parity. Because each bit in asynchronous communications is sent consecutively, it is easy to generalize asynchronous communications by stating that each character is wrapped (framed) by pre-defined bits to mark the beginning and end of the serial transmission of the character. The data rate and communication parameters for asynchronous communications have to be the same at both the transmitting and receiving ends. The communication parameters are baud rate, parity, number of data bits per character, and stop bits (i.e., 9600,N,8,1).

Appendix E – Mechanical Drawing



Appendix F – Compliance Notices

Federal Communications Commission Statement

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in such case the user will be required to correct the interference at the user's expense.

EMC Directive Statement

Products bearing the CE Label fulfill the requirements of the EMC directive (89/336/EEC) and of the low-voltage directive (73/23/EEC) issued by the European Commission.

To obey these directives, the following European standards must be met:

EN55022 Class A – "Limits and methods of measurement of radio interference characteristics of information technology equipment"

EN55024 – "Information technology equipment Immunity characteristics Limits and methods of measurement".

EN60950 (IEC950) – "Safety of information technology equipment, including electrical business equipment"

Warning

This is a Class A Product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures to prevent or correct the interference.

Always use cabling provided with this product if possible. If no cable is provided or if an alternate cable is required, use high-quality shielded cabling to maintain compliance with FCC/EMC directives.

Warranty

Sealevel's commitment to providing the best I/O solutions is reflected in the Lifetime Warranty that is standard on all Sealevel manufactured products. We are able to offer this warranty due to our control of manufacturing quality and the historically high reliability of our products in the field. Sealevel products are designed and manufactured at our Liberty, South Carolina facility, allowing direct control over product development, production, burn-in and testing.

Sealevel Systems, Inc. (hereafter "Sealevel") warrants that the Product shall conform to and perform in accordance with published technical specifications and shall be free of defects in materials and workmanship for life. In the event of failure, Sealevel will repair or replace the product at Sealevel's sole discretion. Failures resulting from misapplication or misuse of the Product, failure to adhere to any specifications or instructions, or failure resulting from neglect or abuse are not covered under this warranty.

Warranty service is obtained by delivering the Product to Sealevel and providing proof of purchase. **Return authorization must be obtained from Sealevel Systems before returned merchandise will be accepted. Authorization is obtained by calling Sealevel Systems and requesting a Return Merchandise Authorization (RMA) number.** The Customer agrees to insure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to Sealevel, and to use the original shipping container or equivalent. Warranty is valid only for original purchaser and is not transferable.

Sealevel Systems assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Sealevel Systems will not be liable for any claim made by any other related party.

This warranty applies to Sealevel manufactured Product. Product purchased through Sealevel but manufactured by a third party will retain the original manufacturer's warranty.

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